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Short communication

Personalized nutritional assessment in children with autism

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Introduction

Autism spectrum disorder (ASD) is a heterogeneous neurodevelopmental condition frequently accompanied by gastrointestinal disturbances, food selectivity, and nutritional imbalances. Emerging evidence suggests that altered dietary patterns and gut microbiota composition may contribute to symptom severity and quality of life in affected children (Alamoudi et al., 2022; Lasheras et al., 2021; Lewandowska-Pietruszka et al., 2023; Nogueira-de-Almeida et al., 2025). Nutritional assessment therefore represents an important component of comprehensive care in ASD. This pilot study aimed to characterize nutritional status, dietary habits, gastrointestinal health, and gut microbiota findings in children with ASD and to explore early outcomes following individualized nutritional interventions.

Materials and methods

This prospective observational pilot study included 15 children with ASD aged 3–12 years who underwent nutritional assessment between April and June 2025.

Nutritional status was evaluated using bioelectrical impedance analysis, which derived body composition parameters including anthropometric measurements. Dietary habits and nutritional challenges were assessed using a validated Food Frequency Questionnaire (FFQ), while mealtime behaviors were evaluated using the Brief Autism Mealtime Behavior Inventory (BAMBI).

Food intolerance testing was performed at the Institute of Immunobiology and Human Genetics, Faculty of Medicine in Skopje and stool microbiome analyses were conducted at the Institute of Public Health and the Institute of Microbiology and parasitology, Faculty of Medicine in Skopje. CYP2D6 metabolizer status was assessed in children receiving pharmacotherapy when clinically indicated.

Based on the integrated assessment, individualized nutritional recommendations were developed and implemented. Follow-up evaluation was performed three months after intervention.

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from the parents or legal guardians of all participating children prior to enrolment. All collected data were

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anonymized and used exclusively for research purposes.

Results and discussion

Baseline assessment demonstrated substantial heterogeneity in nutritional status and dietary patterns. Excess body fat percentage was identified in 60% of participants, reduced protein status in 40%, and elevated BMI consistent with class II obesity in 33%. Mean BMI was 17.8 kg/m². Mineral status was within reference ranges in all children.

Dietary patterns were characterized by limited food diversity, food selectivity, and frequent consumption of processed and carbohydrate-rich foods. Food selectivity appeared strongly associated with sensory sensitivities related to food texture, taste, and smell, particularly affecting the intake of fruits, vegetables, and meat products.

Lactose intolerance was identified in 53% of participants, while gluten intolerance was observed in 20%. Microbiome analysis revealed dysbiosis in all children. The most frequent findings included reduced abundance of *Lactobacillus* species (60%), *Candida* overgrowth (53%), and reduced Bifidobacteria levels (40%).

Three-month follow-up data were available for seven children (47%). Parents reported improvements in food acceptance and willingness to try new foods in a subset of participants. Improved sleep quality was reported in five children (71%), while increased energy levels and better attention were reported in four children (57%). Reduced irritability and hyperactivity were reported in three children (43%).

Anthropometric reassessment showed increases in body weight and skeletal muscle mass in five children (83%), while reductions in body fat percentage were observed in two children (33%). Improvement in mineral status was recorded in four children (66%). Follow-up microbiome analyses were available for six children and indicated partial restoration of microbial balance, including resolution of *Candida* overgrowth and recovery of *Bifidobacteria* in four children (66%), and *Lactobacillus* species in three children (50%). Complete eubiosis was observed in one child.

Given the small sample size and incomplete follow-up, these findings should be considered exploratory. Nevertheless, the results highlight the high prevalence of nutritional challenges and gut microbiota alterations in children with ASD and support the feasibility of individualized nutritional assessment in routine clinical practice.

Conclusion

Children with ASD in this pilot cohort demonstrated considerable variability in nutritional status, dietary behavior, and gut microbiota composition. Individualized nutritional interventions were associated with favorable trends in selected anthropometric, gastrointestinal, and microbiome-related outcomes. Larger prospective studies are warranted to confirm these preliminary findings and to evaluate the effects of personalized nutritional interventions using standardized clinical, nutritional, and microbiome-related outcomes.

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